# Journal of Testing and Evaluation
# Table of Contents, Volume 20
# 1992

## No. 1, January


Evaluation of Elastic Stress Intensity Using *J*-Integral Specimen Geometries—JAMES A. JOYCE AND RON SMUDZ 1

Determination of Ductile-Brittle Transition Temperature (DBTT) in Dynamic Small Punch Test—YEONG-HAN JOO, TOSHIYUKI HASHIDA, AND HIDEAKI TAKAHASHI 6

Finite Element Method (FEM) Analysis of Elastic-Linear-Hardening Materials and Comparison with Measurements on Commercial Materials—YUKITAKA MURAKAMI AND LU PING YUAN 15

Analysis of Gas-Fired Ceramic Radiant Tubes During Transient Heating: Part II—Thermoelastic Stress Analysis—A. E. SEGALL AND J. R. HELLMANN 25

Hydrochlorofluorocarbon (HCFC) Blowing Agents for Foam Insulation of Launch Vehicle Cryogenic Propellant Tanks—ERIC L. STRAUSS AND JOHN W. BZIK 33

Using Microwave Measurements to Detect Moisture in Asphaltic Concrete—IMAD L. AL-QADI 43

Load-Slip Behavior of Nailed Joints in Seven Amazonian Hardwoods—PATRICK J. PELLICANE AND RUY A. SÁ RIBEIRO 51

Experimental Evaluation of a Laboratory Twin-Probe Nuclear Gage for Specimen Density Measurement—T. F. FWA AND S. A. TAN 59

**SYMPOSIUM ON RADIATION SHIELDING FOR THE 21st CENTURY**

Introduction—DOUGLAS E. VOLKMAN 66

Development of a B4C/Al Cermet for Use as an Improved Structural Neutron Absorber—CURTIS J. BEIDLER, WILLIAM E. HAUTH III, AND ARVIND GOEL 67

High Effectiveness Shielding Materials and Optimal Shield Design—EHUD GREENSPAN 71

Properties of High-Density Concrete—P. K. MUKHERJEE 78

Shield Verification Testing at the Idaho Chemical Processing Plant—Fuel Processing Facility—A. J. OSWALD 87

Comparison of Fine Particle Colemanite and Boron Frit in Concrete for Time-Strength Relationship—DOUGLAS E. VOLKMAN AND PETER J. BUSSOLINI 92


## No. 2, March


Crack Tip Opening Displacement (CTOD) Toughness Evaluation by ASTM E 1290 and BS5762: A Comparative Analysis—SOVA BHATTACHARYA AND A. N. KUMAR 99

Critical Assessment of Methods for $J_{Ic}$ Determination—R. K. PANDEY, P. SUNDARAM, AND A. N. KUMAR 106

Tensile Stress Relaxation in High-Strength Spring Steel Wire—U. P. SINHA AND D. W. LEVINSON 114

An Apparatus for Biaxial Strength Testing of Standard Tensile Specimens—K. D. MAZACHEK AND T. N. FADDIS 121

An Efficient Algorithm to Characterize Stress-Strain Data Using Piecewise Linear Curves—ANTHONY J. VIZZINI 126

Compression Testing of Lumber: A Comparison of Methods—DAVID W. GREEN AND JAMES W. EVANS 132

Accelerated Weathering of Marine Fabrics—MARY ANN MOORE AND HELEN H. EPPS 139

Field Evaluation of Pavement Instrumentation Methods—NADAR TABATABAEE, IMAD L. AL-QADI, AND PETER E. SEBAALY 144


## No. 3, May


Fatigue Threshold Regime of a Low Alloy Ferritic Steel Under Closure-Free Testing Conditions: Part I—Compliance Variations in the Threshold Regime—W. V. VAIDYA 157

Fatigue Threshold Regime of a Low Alloy Ferritic Steel Under Closure-Free Testing Conditions: Part II—Hysteresis in Near-Threshold Fatigue Crack Propagation: An Experimental Assessment—W. V. VAIDYA 168

Fatigue Behavior of (BS 1470 N8-0) Aluminum Alloy and (BS 1501-510) Nickel Steel Double-Fillet and Tee-Butt Welds (Subject to Bending)—G. C. WHITE 180

An Experimental Research Program on the Behavior of Stone Masonry Structures—S. CHIOSTRINI AND A. VIGNOLI 190

Laboratory Study of Microtexture-Related Skid Resistance Characteristics of Concrete Pavement Materials—TIEN F. FWA AND CHEOW C. TAN 207

**SYMPOSIUM ON THE USE AND PERFORMANCE OF STAPLES IN THE HUMAN BODY**

Introduction—J. PAUL HARVEY, JR. 216
Mechanical Testing of Stainless Steel Bone Staples—RICHARD LIBERACE AND ZVI LADIN 217
Use of Pneumatically Driven Staples in the Practice of Orthopaedic Surgery—JULES S. SHAPIRO AND MICHAEL J. WALT 225
Comparison of Materials for Staple Pull-Out Tests—A. M. C. THOMAS, P. B. PYNSENT, AND P. F. MCCOMBE 233

**No. 4, July**

New Formulae for Determining Fracture Toughness of a Wide Range of Different Materials with Chevron-Notched Short-Rod and Short-Bar Specimens—X. C. YIN AND T. G. CHEN 239
Charpy Absorbed Energy and $J_{Ic}$ as Measures of Cryogenic Fracture Toughness—I. S. HWANG, M. M. MORRA, R. G. BALLINGER, H. NAKAJIMA, S. SHIMAMOTO, AND R. L. TOBLER 248
Fracture Testing Wood Adhesives with Composite Cantilever Beams—C. TIM SCOTT, BRYAN H. RIVER, AND JAMES A. KOUTSKY 259
Time-Domain Ultrasonic Measurement of the Thickness of a Sub-Half-Wavelength Elastic Layer—CHANGYI ZHU AND VIKRAM K. KINRA 265
High Temperature Tube Burst Test Apparatus—D. L. SHELLEMAN, O. M. JADAAN, D. P. BUTT, R. E. TRESSLER, J. R. HELLMANN, AND J. J. MECHOLSKY, JR. 275
An Evaluation of Strain Measuring Devices for Ceramic Composites—JOHN Z. GYEKENYESI AND PAUL A. BARTOLOTTA 285
Magnetic Particle Testing of Turbine Blades Mounted on the Turbine Rotor Shaft—CLEMENT IMBERT AND KRISHNA RAMPERSAD 296
Podometrics: A New Methodology for Foot Typing—WILLIAM A. ROSSI 301
Characterization of Early and Modern Wire for an Italian Harpsichord—JOHN H. UNDERWOOD, WALTER BURR, A. ANTHONY KAPUSTA, AND CHRISTOPHER A. RICKARD 312

**TECHNICAL NOTES**

Compression of Single-Wall Corrugated Shipping Containers Using Fixed and Floating Test Platens—S. PAUL SINGH, GARY BURGESS, AND MARY LANGLOIS 318
Dynamic Shear Modulus Measurements with Four Independent Techniques in Nickel-Based Alloys—G. V. BLESSING, ALAN WOLFENDEN, V. K. KINRA, Y. T. CHEN, V. DAYAL, M. R. HARMOUCHE, AND P. TERRANOVA 321
Young's Modulus of a Dispersion Strengthened Al-Fe-V-Si Alloy—M. N. SRINIVASAN, A. WOLFENDEN, S. LITTLE, AND S. SRIDHARA 324

**No. 5, September**

Ultrasonic Technique for Residual Stress Measurement in Ductile Iron Continuous Cast Round Bars—MALUR N. SRINIVASAN, SRINIVASULU N. CHUNDU, DON E. BRAY, AND A. ALAGARSAMY 331
The Use of Small Punch (Bulge) Tests to Estimate Fracture Stress in the Lower Shelf Regime—YEONG-HAN JOO, TOSHIYUKI HASHIDA, HIDEAKI TAKAHASHI, AND KEIICHI SHIMOMURA 336
Notch Dimensions for Three-Point Bend Fracture Specimens Based on Compliance Analyses—FRANCIS I. BARATTA AND JOHN H. UNDERWOOD 343
Fracture Toughness Determination Related to Indentation Problems Avoidance in Three-Point Bend Specimens—EDGARDO L. SANTARELLI AND JUAN E. PEREZ IPIÑA 349
On the Intrinsic Character of the Stress-Strain Curve of a Prestressing Steel—JESÚS TORIBIO 357
Superposition Theory Applied to Nail/Glue Joints in Wood: Part 1—Strength Behavior—PATRICK J. PELLICANE 363
A Method for Estimation of the Radius of Elastic-Plastic Boundary Around Cold-Worked Holes—P. R. ARORA, B. DATTAGURU, AND H. S. SUBRAMANYA HANDE 369
Analysis of Elastic and Plastic Strains for Internally Pressurized Cylinders—GRZEGORZ GASIAK 376
Drop Heights Encountered in the United Parcel Service Small Parcel Environment in the United States—S. PAUL SINGH AND TOM VOSS 382

**No. 6, November**

Crack Initiation and Total Fatigue Life of a Carbon Steel in Vacuum and Air—D. KUJAWSKI AND F. ELLYIN 391
The Shear Stress-Strain Curve Determination from Torsion Test in the Large Strain Range—HAN C. WU, ZHIYOU XU, AND PAUL T. WANG 396

An Evaluation of the Impression Test for Estimating the Tensile Properties of Metallic Materials—HARRY N. JONES 403
Comparison of the Fracture Behavior of Conventional Class U Railway Wheels and an Experimental Alloy Wheel—C. Q. BOWLES AND J. R. ROLAND 408
Residual Stresses and Fatigue Precracking Techniques for Weldment Fracture Toughness Specimens—H. S. REEMSNYDER, H. G. PISARSKI, AND M. G. DAWES 416
Effects of Notch Length on the Ductile Fracture of a Center-Notched Low Carbon Steel Plate—CHOBIN MAKABE AND HIDEO KANESHIRO 424
Temperature Calibration of Thermomechanical Analyzers: Part I—The Development of a Standard Method—CHARLES M. EARNEST AND RICKEY J. SEYLER 430
Temperature Calibration of Thermomechanical Analyzers: Part II—An Interlaboratory Test of the Calibration Procedure—RICKEY J. SEYLER AND CHARLES M. EARNEST 434
An Experimental Appraisal of the Load-Deformation Properties of A325 High-Strength Bolts—NAZAR SALIH, JOHN SMITH, HALUK M. AKTAN, AND MUMTAZ USMEN 440
Superposition Theory Applied to Nail/Glue Joints in Wood: Part II—Stiffness Behavior—PATRICK J. PELLICANE 449
Measurement of Thermal Conductivity of Refractory Bricks by the Nonsteady State Hot-Wire Method Using Differential Platinum Resistance Thermometry—K. SENGUPTA, R. DAS, AND G. BANERJEE 454
Application of Electro-Optic Sensor and Force Transducer on Leak Detection—ALI A. I. MANESH, MARK H. SWANEY, AND ROBERT SAUNDERS 460
Vibration Levels in Commercial Truck Shipments as a Function of Suspension and Payload—S. PAUL SINGH AND JORGE MARCONDES 466

**TECHNICAL NOTE**

Laboratory Wheel Tracking Apparatus for Bituminous Pavement Studies—SIEW-ANN TAN, TIEN-FANG FWA, AND BOON-HWEE LOW 470
Discussion of "Analysis of the Size Effect in Low-Load Hardness Testing of Metals," by M. Atkinson—WALTER W. WALKER 475